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Professional Profile

Dr. Kulikowski specializes in the mechanical analysis of structured nano and micro materials. He utilizes advanced material characterization techniques to understand material failures and perform root cause analysis, gaining insight into mechanical failure mechanisms at small length scales. Dr. Kulikowski's expertise includes the mechanical and compositional characterization of films and structures using advanced techniques such as in-situ SEM mechanical testing, nanoindentation, AFM, and FTIR. Dr. Kulikowski leverages these techniques to provide in depth analysis and holistic understanding of the relationship between a material's composition and its mechanical performance. His insights provide clarity on the nature of mechanical failure in devices with nanoscale geometries, ultimately preventing failures and guiding device design and validation.

Before joining exponent, Dr. Kulikowski received his PhD from Stanford University where he studied the mechanics of composite nanostructures produced through DNA origami and two-photon lithography, providing significant experience with ceramic, metallic, polymeric, and composite materials analysis. Here he designed and studied lightweight ordered nanofoams with high strength and impact resistance, gaining valuable experience with testing and analyzing materials at small length scales.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, Stanford University, 2024

M.S., Mechanical Engineering, Stanford University, 2021

B.S., Mechanical Engineering, University of Illinois at Urbana-Champaign, 2019

Publications

Kulikowski J, Delghandi D, Wu C, Figueroa S, Cunningham WS, Gianola DS, Portela CM, Gu XW. Mechanical behavior of nanocluster-based nanocomposites made using two-photon lithography. ACS Applied Materials & Interfaces 2025.

Kulikowski J, Wang S, Aitken Z, Grimm J, Gao B, Wang MM, Doan D, Lee AC, Shen L, Huang W, Devaraj A, Zhang YW, Ke Y, Gu XW. DNA-Silica nanolattices as mechanical metamaterials. Matter 2024; 7(6):2144-2160.

Doan D, Kulikowski J, Gu XW. Direct observation of phase transitions in truncated tetrahedral microparticles under quasi-2D confinement. Nature Communications 2024; 15(1):1954.

Li Q, Zeman IV CJ, Kalkan B, Kirschbaum K, Gianopoulos CG, Parakh A, Doan D, Lee AC, Kulikowski J,

Schatz GC, Shen G, Kunz M, Gu XW. Nano Letters 2022; 23(1):132-139.

Li Q, Kulikowski J, Doan D, Tertuliano OA, Zeman IV CJ, Wang MM, Schatz GC, Gu XW. Mechanical nanolattices printed using nanocluster-based photoresists. Science 2022; 378(6621):768-773.

Kanj A, Thanalakshme RP, Li C, Kulikowski J, Bahl G, Tawfick S. Design, dynamics, and dissipation of a torsional spring mechanism. Mechanical Systems and Signal Processing 2022; 179:109307.

Doan D, Echeveste DJ, Kulikowski J, Gu XW. Machine learning of self-assembled colloidal cones. Soft Matter 2022; 18(7):1532-1539.

Doan D, Kulikowski J, Gu XW. Diffusion of anisotropic colloidal microparticles fabricated using two-photon lithography. Particle & Particle Systems Characterization 2021; 38(8):2100033.

Presentations

Kulikowski J, Wang S, Wang MM, Lee AC, Doan D, Ke Y, Gu XW. Silica coated DNA lattices as mechanical metamaterials. Podium presentation, The TMS Annual Meeting & Exhibition, San Diego, CA, 2023.

Kulikowski J, Li Q, Doan D, Gu XW. Mechanical properties of two photon lithographed structures made using nanocluster-based resins. Podium presentation, The TMS Annual Meeting & Exhibition, Anaheim, CA, 2022.